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EXAMINER	
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2617	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/728,680

Applicant(s)

FERNANDEZ-CORBATON ET AL.

Examiner

Muthuswamy G. Manoharan

Art Unit

2617

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/1/2006 has been entered.

Response to Arguments

Applicant's arguments filed on 10/30/2006 have been fully considered but they are not persuasive.

Applicant argues that, "The Office action further admits that "Yuvuz did not teach expressly, allocates ...(Emphases added)". Yavuz can use the teachings of Jepsen to optimize the system where the sum of the pilot power and the data power is constrained. Jepsen is not teaching away from the claimed invention, since the standards could vary over time. Jepsen teaches how one can vary the dedicated resources between the data and training sequences. Therefore, Jepsen's reference provides constraint (fixing the resources) that has to be added to the Optimization problem of Yavuz. Also, the claimed inventions are not restricted to any particular multiplexing (TDM or CDM).

(Note: **optimization of pilot-to-data channel power is well known in the art. An**

article by "Tong et al.," "Pilot assisted wireless transmissions", IEEE signal processing magazine, November 2004, gives the survey of articles (200 references) published in the area of pilot assisted transmission theory and techniques").

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1,11,18,28,35 and 36 are rejected under 35 U.S.C. 103(a) as being obvious over Yavuz et al. (hereinafter Yavuz) (US 2003/0123406) in view of Chen et al. (hereinafter Chen) ("Adaptive channel estimation and dedicated pilot power adjustment based on the fading rate measurement for a pilot aided CDMA system", IEEE journal on selected areas in communications, vol. 19, no.1, January 2001).

Regarding claim 1, Yavuz teaches a base station (Paragraph [0024], line 8) that adaptively allocates (paragraph [0025], line 14) at least one resource between a traffic signal and a dedicated reference signal (Paragraph [0023], lines 1-6), comprising:

means for receiving a quality metric from a remote station, wherein the quality metric indicates the quality of a signal transmitted from the base station and received by the remote station (Paragraph [0024], lines 1-9) in a common reference signal ("pilot signal"; Paragraph [0023], line 5) and received by the remote station ("down link", Paragraph [0023], line 3) and means for using the quality metric to adaptively allocate a resource to maximize the capacity for transmitting the traffic signal to the remote station ("signal to noise level", "packet error rate", "maximization of data throughput", "adaptively maximized", Paragraph [0011]).

Yavuz did not teach specifically means for using the quality metric to allocate a resource between the traffic signal and the dedicated reference signal.

However, Chen teaches in an analogous art, the quality metric to allocate a resource between the traffic signal and the dedicated reference signal (abstract, "pilot to data power ratio is optimized", page 132, Col. 2, lines 8-19). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use the quality metric to allocate a resource between the traffic signal and the dedicated reference signal. This is because the resources are not unlimited and therefore the power should be constrained. (Note: **optimization of pilot-to-data channel power is well known in the art. An article by "Tong et al.," "Pilot assisted wireless transmissions", gives the survey of articles published in the area of pilot assisted transmission theory and techniques"**)

Claims 11, 18, 28, 35 and 36 are also rejected for the same reason as set forth in the above rejection of claim 1.

Regarding **claim 4**, Yavuz further teaches the base station of claim 1, further comprising means for transmitting a common reference signal to the remote station and to a plurality of other remote stations (Paragraph [0006], lines 4-7).

Regarding **claim 5**, Yavuz further teaches the base station of claim 4, wherein the quality metric comprises a signal-to- interference-and-noise ratio of the common reference signal received at the remote station (Paragraph [0008], lines 5-10; Paragraph [0025], lines 13-16).

Regarding **claim 6**, Yavuz further teaches the base station of claim 4, wherein the quality metric comprises a symbol error rate of the common reference signal received at the remote station (Paragraph [0027], line 9).

Regarding **claim 12**, Yavuz further teaches the remote station of claim 11, wherein the quality metric comprises a signal-to- interference-and-noise ratio of the received common reference signal (Paragraph [0008], lines 5-10; Paragraph [0025], lines 13-16)

Regarding **claim 13**, Yavuz further teaches the remote station of claim 11, wherein the quality metric comprises a symbol error rate of the received common reference signal (Paragraph [0027], line 9).

Regarding **claim 20**, Yavuz further teaches the base station of claim 18, wherein the resource comprises a time slot in a time- division multiplexed signal (Paragraph [0027], line 18).

Regarding **claim 21**, Yavuz further teaches the base station of claim 18, further comprising means for transmitting a common reference signal to the remote station and to a plurality of other remote stations (Paragraph [0006], lines 4-7).

Regarding **claim 22**, Yavuz further teaches the base station of claim 21, wherein the quality metric comprises a signal-to-interference-and-noise ratio of the common reference signal received at the remote station (Paragraph [0008], lines 5-10; Paragraph [0025], lines 13-16).

Regarding **claim 23**, Yavuz further teaches the base station of claim 21, wherein the quality metric comprises a symbol error rate of the common reference signal received at the remote station (Paragraph [0008], lines 5-10; Paragraph [0025], lines 13-16).

Claims 2, and 19 are rejected under 35 U.S.C. 103(a) as being obvious over Yavuz et al. (hereinafter Yavuz) (US 2003/0123406) in view of Chen et al. (hereinafter Chen) ("Adaptive channel estimation and dedicated pilot power adjustment based on the fading rate measurement for a pilot aided CDMA system", IEEE journal on selected areas in communications, vol. 19, no.1, January 2001) and further in view of Haim (US 2002/0102944).

Regarding claim 2(19), Yavuz in view of Chen discloses all the particulars of the claim except, wherein the resource comprises power. However, Haim teaches in an analogous art, the base station of claim 1(18), wherein the resource comprises power (Abstract, lines 6-14). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have the base station of claim 1(18), wherein the resource comprises power. This modification helps in controlling the multiple access interference.

Claims 7,8,14,15,24,25,31 and 32 34 are rejected under 35 U.S.C. 103(a) as being

obvious over Yavuz et al. (hereinafter Yavuz) (US 2003/0123406) in view of Chen et al. (hereinafter Chen) ("Adaptive channel estimation and dedicated pilot power adjustment based on the fading rate measurement for a pilot aided CDMA system", IEEE journal on selected areas in communications, vol. 19, no.1, January 2001) and further in view of Farlow (WO 02/13448 A2).

Regarding **claims 7,14,24 and 31**, Yavuz in view of Chen discloses all the particulars of the claim except for means for transmitting a parameter to the remote station, wherein the parameter represents the portion of the resource allocated to the dedicated reference signal.

However, Farlow teaches in an analogous art, means for transmitting a parameter to the remote station, wherein the parameter represents the portion of the resource allocated to the dedicated reference signal (**Page 10, lines 20-25**). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have means for transmitting a parameter to the remote station, wherein the parameter represents the portion of the resource allocated to the dedicated reference signal. This modification provides a method and system of power control adaption for data rate changes resulting in more optimal performance.

Also, this modification is a necessity than an inventive step. This is because, the length of the reference signal changes that information has to be informed to the receiver to process the signal. Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have means for transmitting a parameter to the remote station, wherein the parameter represents the portion of the resource allocated to the

dedicated reference signal.

Regarding **claims 8,15,25, and 32**, Yavuz in view of Chen discloses all the particulars of the claim except for transmitting a parameter q to the base station, wherein the parameter $\Theta=(L-1)/n$.

However, Farlow discloses in an analogous art transmitting a parameter to the base station, wherein the parameter $\Theta=(L-1)/n$ (Page 9, lines 20-24). Therefore, it would be obvious to one of ordinary skill in the art at the time invention to transmit a parameter q to the base station, wherein the parameter $\Theta=(L-1)/n$. This modification is useful in estimating channel conditions and thus reducing the signal distortion introduced by the channel.

Claims 9,10,16,17,26,27,33, and 34 are rejected under 35 U.S.C. 103(a) as being obvious over Yavuz et al. (hereinafter Yavuz) (US 2003/0123406) in view of Chen et al. (hereinafter Chen) ("Adaptive channel estimation and dedicated pilot power adjustment based on the fading rate measurement for a pilot aided CDMA system", IEEE journal on selected areas in communications, vol. 19, no.1, January 2001) and further in view of Frank (US 6904081).

Regarding **claim 9**, Yavuz in view of Chen discloses all the particulars of the claim except means for computing the coefficients of an L -tap linear equalizer using a least squares estimation method over n chips of the common reference signal; and means for receiving a parameter $\Theta=(L-1)/n$ from the remote station. However Frank teaches in an analogous art, means for computing the coefficients of an L -tap linear equalizer using a

least squares estimation method over n chips of the common reference signal (Col. 4, lines 34-59); and means for receiving a parameter $\Theta=(L-1)/n$ from the remote station. Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have the base station of claim 1, further comprising: means for computing the coefficients of an L -tap linear equalizer using a least squares estimation method over n chips of the common reference signal; and means for receiving a parameter $\Theta=(L-1)/n$ from the remote station. This modification is useful in estimating channel conditions and thus reducing the signal distortion introduced by the channel.

Regarding **claim 10**, Yavuz in view of Chen discloses all the particulars of the claim except means for computing the coefficients of an L -tap linear equalizer using a least squares estimation method over n chips of the common reference signal; and means for agreeing with the remote station about a fixed value for the parameter $\Theta=(L-1)/n$. However Frank teaches in an analogous art, means for computing the coefficients of an L -tap linear equalizer using a least squares estimation method over n chips of the common reference signal; and means for agreeing with the remote station about a fixed value for the parameter $\Theta=(L-1)/n$ (Col. 4, lines 34-59). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have the base station of claim 1, further comprising: means for computing the coefficients of an L -tap linear equalizer using a least squares estimation method over n chips of the common reference signal; and means for agreeing with the remote station about a fixed value for the parameter $\Theta=(L-1)/n$. This modification is useful in estimating channel conditions and thus reducing the signal distortion introduced by the channel.

Regarding **claim 16**, Yavuz in view of Chen discloses all the particulars of the claim except means for computing the coefficients of an L -tap linear equalizer using a least squares estimation method over n chips of the common reference signal; and means for transmitting a parameter $\Theta=(L-1)/n$. However Frank teaches in an analogous art, means for computing the coefficients of an L -tap linear equalizer using a least squares estimation method over n chips of the common reference signal (Col. 4, lines 34-59); and means for transmitting a parameter $\Theta=(L-1)/n$. Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have the base station of 11, further comprising: means for computing the coefficients of an L -tap linear equalizer using a least squares estimation method over n chips of the common reference signal; and means for transmitting a parameter $\Theta=(L-1)/n$. This modification is useful in estimating channel conditions and thus reducing the signal distortion introduced by the channel.

Regarding **claim 17**, Yavuz in view of Chen discloses all the particulars of the claim except means for computing the coefficients of an L -tap linear equalizer using a least squares estimation method over n chips of the common reference signal; and means for agreeing with the base station about a fixed value for the parameter $\Theta=(L-1)/n$. However Frank teaches in an analogous art, means for computing the coefficients of an L -tap linear equalizer using a least squares estimation method over n chips of the common reference signal; and means for agreeing with the base station about a fixed value for the parameter $\Theta=(L-1)/n$ (Col. 4, lines 34-59). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have the base station of 11,

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further comprising: means for computing the coefficients of an L -tap linear equalizer using a least squares estimation method over n chips of the common reference signal; and means for agreeing with the base station about a fixed value for the parameter $\Theta=(L-1)/n$. This modification is useful in estimating channel conditions and thus reducing the signal distortion introduced by the channel.

Regarding **claims 26**, Yavuz in view of Chen discloses all the particulars of the claim except for a training component at the remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer and wherein the receiver receives a parameter $\Theta=(L-1)/n$ from the remote station. However frank teaches in an analogous art, a training component at the remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer and wherein the receiver receives a parameter $\Theta=(L-1)/n$ from the remote station (Col. 4, lines 34-59). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have a training component at the remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer and wherein the receiver receives a parameter $\Theta=(L-1)/n$ from the remote station. This modification is useful in estimating channel conditions and thus reducing the signal distortion introduced by the channel.

Regarding **claims 27**, Yavuz in view of Chen discloses all the particulars of the claim except for a training component at the remote station employs a least squares

estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer, and wherein the base station is configured to agree with the remote station about a fixed value for the parameter $\Theta=(L-1)/n$. However Frank teaches in an analogous art, a training component at the remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer, and wherein the base station is configured to agree with the remote station about a fixed value for the parameter $\Theta=(L-1)/n$ (Col. 4, lines 34-59). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have a training component at the remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer, and wherein the base station is configured to agree with the remote station about a fixed value for the parameter $\Theta=(L-1)/n$. This modification is useful in estimating channel conditions and thus reducing the signal distortion introduced by the channel.

Regarding **claim 33**, Yavuz in view of Chen discloses all the particulars of the claim except for a training component at the remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer and wherein the transmitter also transmits a parameter $\Theta=(L-1)/n$ from the remote station. However Frank teaches in an analogous art, a training component at the remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer and wherein the transmitter also transmits a parameter $\Theta=(L-1)/n$

from the remote station (Col. 4, lines 34-59). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have a training component at the remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer and wherein the transmitter also transmits a parameter $\Theta=(L-1)/n$ from the remote station. This modification is useful in estimating channel conditions and thus reducing the signal distortion introduced by the channel.

Regarding **claim 34**, Yavuz in view of Chen discloses all the particulars of the claim except for a training component at the remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer, and wherein the remote station is configured to agree with the base station about a fixed value for the parameter $\Theta=(L-1)/n$. However Frank teaches in an analogous art, a training component at the remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer, and wherein the remote station is configured to agree with the base station about a fixed value for the parameter $\Theta=(L-1)/n$ (Col.4, lines 34-59). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have a training component at the remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer and wherein the remote station is configured to agree with the base station about a fixed value for the parameter $\Theta=(L-1)/n$. This modification is useful in estimating channel conditions and thus reducing the

signal distortion introduced by the channel.

Claims 1,3,4,5,6,11-13,18,20-23,28-30,35 and 36 are rejected under 35 U.S.C. 103(a) as being obvious over Yavuz et al. (hereinafter Yavuz) (US 2003/0123406) in view of Jepsen et al. (hereinafter Jepsen) (US 6724815).

Regarding **claim 1**, Yavuz teaches a base station (Paragraph [0024], line 8) that adaptively allocates (paragraph [0025], line 14) at least one resource between a traffic signal and a dedicated reference signal (Paragraph [0023], lines 1-6), comprising: means for receiving a quality metric from a remote station, wherein the quality metric indicates the quality of a signal transmitted from the base station and received by the remote station (Paragraph [0024], lines 1-9) in a common reference signal ("pilot signal"; Paragraph [0023], line 5) and received by the remote station ("down link", Paragraph [0023], line 3) and means for using the quality metric to adaptively allocate a resource to maximize the capacity for transmitting the traffic signal to the remote station ("signal to noise level", "packet error rate", "maximization of data throughput", "adaptively maximized", Paragraph [0011]).

Yavuz did not teach specifically means for using the quality metric to allocate a resource between the traffic signal and the dedicated reference signal; and means for transmitting the dedicated reference signal and the traffic signal to the remote station wherein the received common reference signal and the received dedicated reference signal are used to train a receiver at the remote station.

However, Jepsen teaches in an analogous art, the quality metric ("**measure an**

indicator of the transmission quality"; Col. 5, lines 24-28) to allocate a resource between the traffic signal and the dedicated reference signal ("**data**", "**training sequence**"; Figure 2; "suitable **training data** structure", Col. 5, lines 45-46); and means for transmitting the dedicated reference signal and the traffic signal to the remote station (Col. 6, lines 44-47) wherein the received common reference signal (Col. 5; lines 28-31) and the received dedicated reference signal ("**training data**"; Col. 5; lines 45-46; Col. 6, lines 45-47) are used to train a receiver at the remote station (Figure 3). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use the means for using the quality metric to allocate a resource between the traffic signal and the dedicated reference signal; and means for transmitting the dedicated reference signal and the traffic signal to the remote station wherein the received common reference signal and the received dedicated reference signal are used to train a receiver at the remote station to improve the communication system efficiently.

Regarding **claim 3**, Yavuz further teaches the base station of claim 1, wherein the resource comprises a time slot in a time- division multiplexed signal (Paragraph [0027], line 18).

Regarding **claim 4**, Yavuz further teaches the base station of claim 1, further comprising means for transmitting a common reference signal to the remote station and to a plurality of other remote stations (Paragraph [0006], lines 4-7).

Regarding **claim 5**, Yavuz further teaches the base station of claim 4, wherein the quality metric comprises a signal-to- interference-and-noise ratio of the common

reference signal received at the remote station (Paragraph [0008], lines 5-10;
Paragraph [0025], lines 13-16).

Regarding **claim 6**, Yavuz further teaches the base station of claim 4, wherein the quality metric comprises a symbol error rate of the common reference signal received at the remote station (Paragraph [0027], line 9).

Regarding **claim 11**, Yavuz teaches a remote station (items 8a, 8b, 8c, 8d, 8e in Figure 1) that adaptively allocates (paragraph [0025], line 14) at least one resource between a traffic signal and a dedicated reference signal (Paragraph [0023], lines 1-6), comprising: means for receiving a common reference signal, a dedicated reference signal, and a traffic signal from a base station (Paragraph [0023], lines 1-6); means for determining a quality metric of the received common reference signal (Paragraph [0024], lines 1-9); means for transmitting the quality metric to the base station, wherein the base station uses the quality metric to allocate a resource between the dedicated reference signal and the traffic signal (Paragraph [0027], lines 19-23); and means for using the received common reference signal and the received dedicated reference signal to train a receiver at the remote station (Paragraph [0023], lines 7-10); and means for using the quality metric to adaptively allocate a resource to maximize the capacity for transmitting the traffic signal to the remote station ("signal to noise level", "packet error rate", "maximization of data throughput", "adaptively maximized", Paragraph [0011]).

Yavuz did not teach expressly, allocates at least one resource between a traffic signal and a dedicated reference signal and means for using the received common

reference signal and the received dedicated reference signal to train a receiver at the remote station.

However, Jepsen teaches in an analogous art, the quality metric ("**measure an indicator of the transmission quality**"; Col. 5, lines 24-28) to allocate a resource between the traffic signal and the dedicated reference signal ("**data**", "**training sequence**"; Figure 2; "suitable **training data** structure", Col. 5, lines 45-46); and means for transmitting the dedicated reference signal and the traffic signal to the remote station (Col. 6, lines 44-47) wherein the received common reference signal (Col. 5; lines 28-31) and the received dedicated reference signal ("**training data**"; Col. 5; lines 45-46; Col. 6, lines 45-47) are used to train a receiver at the remote station (Figure 3).

Therefore, it would be obvious to one of ordinary skill in the art at the time of invention have a remote station that adaptively allocates at least one resource between a traffic signal and a dedicated reference signal, comprising: means to allocate at least one resource between a traffic signal and a dedicated reference signal in order to improve the efficiency of use of the radio channel to improve the efficiency of use of the radio channel.

Regarding **claim 12**, Yavuz further teaches the remote station of claim 11, wherein the quality metric comprises a signal-to- interference-and-noise ratio of the received common reference signal (Paragraph [0008], lines 5-10; Paragraph [0025], lines 13-16)

Regarding **claim 13**, Yavuz further teaches the remote station of claim 11, wherein the quality metric comprises a symbol error rate of the received common reference signal (Paragraph [0027], line 9).

Regarding **claim 18**, Yavuz teaches a base station (Paragraph [0024], line 8) that adaptively allocates (paragraph [0025], line 14) at least one resource between a traffic signal and a dedicated reference signal (Paragraph [0023], lines 1-6), comprising: a receiver that receives a quality metric from a remote station, wherein the quality metric indicates the quality of a signal transmitted from the base station in a common reference signal and received by the remote station (Paragraph [0024], lines 1-9); a resource allocation component that uses the quality metric to allocate a resource between the traffic signal and the dedicated reference signal (Paragraph [0027], lines 19-23); and a transmitter that transmits the traffic signal and the dedicated reference signal to the remote station (Paragraph [0031], lines 1-6); and a resource allocation component that uses quality metric to adaptively allocate a resource to maximize the capacity for transmitting the traffic signal to the remote station ("signal to noise level", "packet error rate", "maximization of data throughput", "adaptively maximized", Paragraph [0011]).

Yavuz did not teach expressly, allocates at least one resource between a traffic signal and a dedicated reference signal and means for using the received common reference signal and the received dedicated reference signal to train a receiver at the remote station.

However, Jepsen teaches in an analogous art, the quality metric ("**measure an indicator of the transmission quality**"; Col. 5, lines 24-28) to allocate a resource between the traffic signal and the dedicated reference signal ("**data**", "**training sequence**"; Figure 2; "**suitable training data structure**", Col. 5, lines 45-46); and means

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for transmitting the dedicated reference signal and the traffic signal to the remote station (Col. 6, lines 44-47) wherein the received common reference signal (Col. 5; lines 28-31) and the received dedicated reference signal ("**training data**"; Col. 5; lines 45-46; Col. 6, lines 45-47) are used to train a receiver at the remote station (Figure 3).

Regarding **claim 20**, Yavuz further teaches the base station of claim 18, wherein the resource comprises a time slot in a time- division multiplexed signal (Paragraph [0027], line 18).

Regarding **claim 21**, Yavuz further teaches the base station of claim 18, further comprising means for transmitting a common reference signal to the remote station and to a plurality of other remote stations (Paragraph [0006], lines 4-7).

Regarding **claim 22**, Yavuz further teaches the base station of claim 21, wherein the quality metric comprises a signal-to- interference-and-noise ratio of the common reference signal received at the remote station (Paragraph [0008], lines 5-10; Paragraph [0025], lines 13-16).

Regarding **claim 23**, Yavuz further teaches the base station of claim 21, wherein the quality metric comprises a symbol error rate of the common reference signal received at the remote station (Paragraph [0008], lines 5-10; Paragraph [0025], lines 13-16).

Regarding **claim 28**, Yavuz teaches a remote station (items 8a, 8b, 8c, 8d, 8e in Figure 1) configured to facilitate adaptive allocation (paragraph [0025], line 14) of at least one resource between a traffic signal and a dedicated reference signal (Paragraph

[0023], lines 1-6), the remote station comprising: a receiver that receives a common reference signal, a dedicated reference signal, and a traffic signal from a base station (Paragraph [0023], lines 1-6); a signal quality measurement component that determines a quality metric of the received common reference signal (Paragraph [0024], lines 1-9); a transmitter that transmits the quality metric to the base station, wherein the base station uses the quality metric to allocate a resource between the dedicated reference signal and the traffic signal (Paragraph [0027], lines 19-23); and a training component that uses the received common reference signal and the received dedicated reference signal to train the receiver (Paragraph [0031], lines 1-6).

Yavuz did not teach expressly, allocates at least one resource between a traffic signal and a dedicated reference signal and means for using the received common reference signal and the received dedicated reference signal to train a receiver at the remote station.

However, Jepsen teaches in an analogous art, the quality metric ("**measure an indicator of the transmission quality**"; Col. 5, lines 24-28) to allocate a resource between the traffic signal and the dedicated reference signal ("**data**", "**training sequence**"; Figure 2; "**suitable training data structure**", Col. 5, lines 45-46); and means for transmitting the dedicated reference signal and the traffic signal to the remote station (Col. 6, lines 44-47) wherein the received common reference signal (Col. 5; lines 28-31) and the received dedicated reference signal ("**training data**"; Col. 5; lines 45-46; Col. 6, lines 45-47) are used to train a receiver at the remote station (Figure 3).

Regarding **claim 29**, Yavuz further teaches the remote station of claim 28, wherein

the quality metric comprises a signal-to-interference-and-noise ratio of the received common reference signal (Paragraph [0008], lines 5-10; Paragraph [0025], lines 13-16).

Regarding **claim 30**, Yavuz further teaches the remote station of claim 28, wherein the quality metric comprises a symbol error rate of the received common reference signal (Paragraph [0027], line 9).

Regarding **claim 35**, Yavuz teaches in a base station, a method for adaptively allocating (paragraph [0025], line 14) at least one resource between a traffic signal and a dedicated reference signal (Paragraph [0023], lines 1-6), comprising: receiving a quality metric from a remote station, wherein the quality metric indicates the quality of a signal transmitted from the base station and received by the remote station (Paragraph [0024], lines 1-9); using the quality metric to allocate a resource between the traffic signal and the dedicated reference signal (Paragraph [0027], lines 19-23); and transmitting the dedicated reference signal and the traffic signal to the remote station (Paragraph [0031], lines 1-6); and using the quality metric to adaptively allocate a resource to maximize the capacity for transmitting the traffic signal to the remote station ("signal to noise level", "packet error rate", "maximization of data throughput", "adaptively maximized", Paragraph [0011]).

Yavuz did not teach expressly, allocates at least one resource between a traffic signal and a dedicated reference signal and means for using the received common reference signal and the received dedicated reference signal to train a receiver at the remote station.

However, Jepsen teaches in an analogous art, the quality metric ("**measure an**

indicator of the transmission quality"; Col. 5, lines 24-28) to allocate a resource between the traffic signal and the dedicated reference signal ("**data**", "**training sequence**"; Figure 2; "suitable **training data** structure", Col. 5, lines 45-46); and means for transmitting the dedicated reference signal and the traffic signal to the remote station (Col. 6, lines 44-47) wherein the received common reference signal (Col. 5; lines 28-31) and the received dedicated reference signal ("**training data**"; Col. 5; lines 45-46; Col. 6, lines 45-47) are used to train a receiver at the remote station (Figure 3).

Regarding **claim 36**, Yavuz teaches in a remote station, a method for facilitating adaptive allocation (paragraph [0025], line 14) of at least one resource between a traffic signal and a dedicated reference signal (Paragraph [0023], lines 1-6), comprising: receiving a common reference signal, a dedicated reference signal, and a traffic signal from a base station (Paragraph [0031], lines 1-6); determining a quality metric of the received common reference signal (Paragraph [0024], lines 1-9); transmitting the quality metric to the base station, wherein the base station uses the quality metric to allocate a resource between the dedicated reference signal and the traffic signal (Paragraph [0027], lines 19-23); and using the received common reference signal and the received dedicated reference signal to train a receiver at the remote station (Paragraph [0031], lines 1-6); and means for using the quality metric to adaptively allocate a resource to maximize the capacity for transmitting the traffic signal to the remote station ("signal to noise level", "packet error rate", "maximization of data throughput", "adaptively maximized", Paragraph [0011]).

Yavuz did not teach expressly, allocates at least one resource between a traffic

signal and a dedicated reference signal and means for using the received common reference signal and the received dedicated reference signal to train a receiver at the remote station.

However, Jepsen teaches in an analogous art, the quality metric ("**measure an indicator of the transmission quality**"; Col. 5, lines 24-28) to allocate a resource between the traffic signal and the dedicated reference signal ("**data**", "**training sequence**"; Figure 2; "suitable **training data** structure", Col. 5, lines 45-46); and means for transmitting the dedicated reference signal and the traffic signal to the remote station (Col. 6, lines 44-47) wherein the received common reference signal (Col. 5; lines 28-31) and the received dedicated reference signal ("**training data**"; Col. 5; lines 45-46; Col. 6, lines 45-47) are used to train a receiver at the remote station (Figure 3).

Claims 2, and 19 are rejected under 35 U.S.C. 103(a) as being obvious over Yavuz et al. (hereinafter Yavuz) (US 2003/0123406) in view of Jepsen et al. (hereinafter Jepsen) (US 6724815) and further in view of Haim (US 2002/0102944).

Regarding claim 2(19), Yavuz in view of Jepsen discloses all the particulars of the claim except, wherein the resource comprises power. However, Haim teaches in an analogous art, the base station of claim 1(18), wherein the resource comprises power (Abstract, lines 6-14). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have the base station of claim 1(18), wherein the resource comprises power. This modification helps in controlling the multiple access interference.

Claims 7,8,14,15,24,25,31 and 32 34 are rejected under 35 U.S.C. 103(a) as being obvious over Yavuz et al. (hereinafter Yavuz) (US 2003/0123406) in view of Jepsen et al. (hereinafter Jepsen) (US 6724815) and further in view of Farlow (WO 02/13448 A2).

Regarding **claims 7,14,24 and 31**, Yavuz in view of Jepsen discloses all the particulars of the claim except for means for transmitting a parameter to the remote station, wherein the parameter represents the portion of the resource allocated to the dedicated reference signal.

However, Farlow teaches in an analogous art, means for transmitting a parameter to the remote station, wherein the parameter represents the portion of the resource allocated to the dedicated reference signal (**Page 10, lines 20-25**). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have means for transmitting a parameter to the remote station, wherein the parameter represents the portion of the resource allocated to the dedicated reference signal. This modification provides a method and system of power control adaption for data rate changes resulting in more optimal performance.

Also, this modification is a necessity than an inventive step. This is because, the length of the reference signal changes that information has to be informed to the receiver to process the signal. Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have means for transmitting a parameter to the remote station, wherein the parameter represents the portion of the resource allocated to the

dedicated reference signal.

Regarding **claims 8,15,25, and 32**, Yavuz in view of Jepsen discloses all the particulars of the claim except for transmitting a parameter q to the base station, wherein the parameter $\Theta=(L-1)/n$.

However, Farlow discloses in an analogous art transmitting a parameter to the base station, wherein the parameter $\Theta=(L-1)/n$ (Page 9, lines 20-24). Therefore, it would be obvious to one of ordinary skill in the art at the time invention to transmit a parameter q to the base station, wherein the parameter $\Theta=(L-1)/n$. This modification is useful in estimating channel conditions and thus reducing the signal distortion introduced by the channel.

Claims 9,10,16,17,26,27,33, and 34 are rejected under 35 U.S.C. 103(a) as being obvious over Yavuz et al. (hereinafter Yavuz) (US 2003/0123406) in view of Jepsen et al. (hereinafter Jepsen) (US 6724815) and further in view of Frank (US 6904081).

Regarding **claim 9**, Yavuz in view of Jepsen discloses all the particulars of the claim except means for computing the coefficients of an L -tap linear equalizer using a least squares estimation method over n chips of the common reference signal; and means for receiving a parameter $\Theta=(L-1)/n$ from the remote station. However Frank teaches in an analogous art, means for computing the coefficients of an L -tap linear equalizer using a least squares estimation method over n chips of the common reference signal (Col. 4, lines 34-59); and means for receiving a parameter $\Theta=(L-1)/n$ from the remote station. Therefore, it would be obvious to one of ordinary skill in the art

at the time of invention to have the base station of claim 1, further comprising: means for computing the coefficients of an L -tap linear equalizer using a least squares estimation method over n chips of the common reference signal; and means for receiving a parameter $\Theta=(L-1)/n$ from the remote station. This modification is useful in estimating channel conditions and thus reducing the signal distortion introduced by the channel.

Regarding **claim 10**, Yavuz in view of Jepsen discloses all the particulars of the claim except means for computing the coefficients of an L -tap linear equalizer using a least squares estimation method over n chips of the common reference signal; and means for agreeing with the remote station about a fixed value for the parameter $\Theta=(L-1)/n$. However Frank teaches in an analogous art, means for computing the coefficients of an L -tap linear equalizer using a least squares estimation method over n chips of the common reference signal; and means for agreeing with the remote station about a fixed value for the parameter $\Theta=(L-1)/n$ (Col. 4, lines 34-59). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have the base station of claim 1, further comprising: means for computing the coefficients of an L -tap linear equalizer using a least squares estimation method over n chips of the common reference signal; and means for agreeing with the remote station about a fixed value for the parameter $\Theta=(L-1)/n$. This modification is useful in estimating channel conditions and thus reducing the signal distortion introduced by the channel.

Regarding **claim 16**, Yavuz in view of Jepsen discloses all the particulars of the claim except means for computing the coefficients of an L -tap linear equalizer using a

least squares estimation method over n chips of the common reference signal; and means for transmitting a parameter $\Theta=(L-1)/n$. However Frank teaches in an analogous art, means for computing the coefficients of an L -tap linear equalizer using a least squares estimation method over n chips of the common reference signal (Col. 4, lines 34-59); and means for transmitting a parameter $\Theta=(L-1)/n$. Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have the base station of 11, further comprising: means for computing the coefficients of an L -tap linear equalizer using a least squares estimation method over n chips of the common reference signal; and means for transmitting a parameter $\Theta=(L-1)/n$. This modification is useful in estimating channel conditions and thus reducing the signal distortion introduced by the channel.

Regarding **claim 17**, Yavuz in view of Jepsen discloses all the particulars of the claim except means for computing the coefficients of an L -tap linear equalizer using a least squares estimation method over n chips of the common reference signal; and means for agreeing with the base station about a fixed value for the parameter $\Theta=(L-1)/n$. However Frank teaches in an analogous art, means for computing the coefficients of an L -tap linear equalizer using a least squares estimation method over n chips of the common reference signal; and means for agreeing with the base station about a fixed value for the parameter $\Theta=(L-1)/n$ (Col. 4, lines 34-59). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have the base station of 11, further comprising: means for computing the coefficients of an L -tap linear equalizer using a least squares estimation method over n chips of the common reference signal;

and means for agreeing with the base station about a fixed value for the parameter $\Theta=(L-1)/n$. This modification is useful in estimating channel conditions and thus reducing the signal distortion introduced by the channel.

Regarding **claims 26**, Yavuz in view of Jepsen discloses all the particulars of the claim except for a training component at the remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer and wherein the receiver receives a parameter $\Theta=(L-1)/n$ from the remote station. However frank teaches in an analogous art, a training component at the remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer and wherein the receiver receives a parameter $\Theta=(L-1)/n$ from the remote station (Col. 4, lines 34-59). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have a training component at the remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer and wherein the receiver receives a parameter $\Theta=(L-1)/n$ from the remote station. This modification is useful in estimating channel conditions and thus reducing the signal distortion introduced by the channel.

Regarding **claims 27**, Yavuz in view of Jepsen discloses all the particulars of the claim except for a training component at the remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer, and wherein the base station is configured to

agree with the remote station about a fixed value for the parameter $\Theta=(L-1)/n$. However Frank teaches in an analogous art, a training component at the remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer, and wherein the base station is configured to agree with the remote station about a fixed value for the parameter $\Theta=(L-1)/n$ (Col. 4, lines 34-59). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have a training component at the remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer, and wherein the base station is configured to agree with the remote station about a fixed value for the parameter $\Theta=(L-1)/n$. This modification is useful in estimating channel conditions and thus reducing the signal distortion introduced by the channel.

Regarding **claim 33**, Yavuz in view of Jepsen discloses all the particulars of the claim except for a training component at the remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer and wherein the transmitter also transmits a parameter $\Theta=(L-1)/n$ from the remote station. However Frank teaches in an analogous art, a training component at the remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer and wherein the transmitter also transmits a parameter $\Theta=(L-1)/n$ from the remote station (Col. 4, lines 34-59). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have a training component at the

remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer and wherein the transmitter also transmits a parameter $\Theta=(L-1)/n$ from the remote station. This modification is useful in estimating channel conditions and thus reducing the signal distortion introduced by the channel.

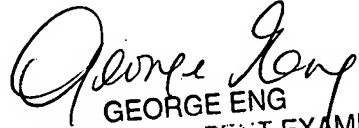
Regarding **claim 34**, Yavuz in view of Jepsen discloses all the particulars of the claim except for a training component at the remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer, and wherein the remote station is configured to agree with the base station about a fixed value for the parameter $\Theta=(L-1)/n$. However Frank teaches in an analogous art, a training component at the remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer, and wherein the remote station is configured to agree with the base station about a fixed value for the parameter $\Theta=(L-1)/n$ (Col.4, lines 34-59). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have a training component at the remote station employs a least squares estimation method over n chips of the common reference signal to compute the coefficients of an L -tap linear equalizer and wherein the remote station is configured to agree with the base station about a fixed value for the parameter $\Theta=(L-1)/n$. This modification is useful in estimating channel conditions and thus reducing the signal distortion introduced by the channel.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Muthuswamy G. Manoharan whose telephone number is 571-272-5515. The examiner can normally be reached on 7:00AM-2:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eng George can be reached on 571-272-7495. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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